Add-Ins

PAVERGIS Interface

GIS Overview

The PAVERGIS program provides Geographical Information Systems (GIS) capabilities for viewing and presenting pavement inspection and work plan information available to PAVER users. The PAVERGIS program assists in the setup and maintenance of your PAVER data in a format compatible with Environmental Systems Research Institute's (ESRI) ArcView software. The first part of this chapter briefly introduces some of the CAD/GIS concepts used to setup pavements for use in a GIS environment. The remainder of the chapter details the installation procedure for the PAVERGIS software as well as the functionality of the software once a GIS coverage has been properly created.

Distinctions between CAD and GIS

There is a distinction between traditional Computer Aided Design (CAD) software and Geographic Information Systems (GIS) terminology. CAD describes entities as lines, circles, ellipses, arcs, and points. Layers are used to differentiate between functional, physical, and location differences of entities. In GIS terminology, arcs are used to describe all linear entities, whether they are lines, circles, etc. Points are still points, but an additional entity, called a polygon, describes a series of entities that completely enclose any geometric shape. Collectively, polygons, arcs, and points make up the three distinct feature classes. Coverages are analogous to Layers. However, only one type of feature is typically present in a single coverage. Coverages may contain polygon and arc features, or arc and point features, but not polygon and point features.

Polygon and Arc Attribute Tables

The two features that can be used to represent pavements are polygons and arcs. If polygons are used to describe the sections in a PAVER database, then a Polygon Attribute Table (PAT) is created as part of the coverage. If arc segments represent the sections, then an Arc Attribute Table (AAT) is created as part of the coverage. A coverage is defined by several files (PAT, AAT, etc.). Some of the files contain graphical information, and others contain table information. Our discussion focuses on PATs. AAT users can substitute AAT for PAT in the text. The section on polygon closure is not be applicable for AAT users.

Software Context

The material presented here assumes one of the following CAD/GIS software tool environments are used:

AutoCAD + ArcCAD = Coverage for ArcView

Intergraph + DGNARC = Coverage for ArcView

PC ArcInfo = Coverage for ArcView

Acquiring Computer-Based Graphical Representations

The most clean GIS maps are created by graphically inputting the pavement network system data directly into a GIS environment. This approach eliminates many potential problems, which is discussed later. However, it is not always possible to enter data directly into a GIS environment. The following discussion is geared towards those operators who obtain their graphical display on AutoCAD either by scanning maps, scanning aerial photographs, or manual digitization of maps. You may be able to get an electronic information transfer from other agencies such as the state, United States Geological Survey (USGS), or utility companies. Look into these possibilities before spending money on work that may have already been done.

Manual Digitization of Preexisting Drawings

Manual digitization has the advantage of continuity of line segments; that is, each line starts at the exact endpoint of the previous line segment and ends at the exact beginning of the next line segment. This is an important concept when we discuss GIS systems. However, manual digitization is very time consuming and may be impractical for some users with limited time resources. If this method is chosen, it is important to close all polygon sections and create layers relevant to the project.

Scanning Maps or Aerial Photography

Scanning is faster for inputting graphical data. However, some errors may be introduced in the automated digitization process, such as dangling line segments (lines which look continuous but have small under or overshoots) and random error from "noise" introduced by the scanning medium - the device or the pictorial representation being scanned. Once scanned, the map must be edited to assure that the lines are connected, polygons are closed, section lines are added, and appropriate features are placed on respective layers.

Aerial photography has the potential to be the most accurate but is by far the most expensive. One possible solution to this is to have aerial photographs taken with a group of other interested parties. This spreads the cost of the project between members of the group and each member still derives the same utility as if they had contracted out alone.

Modifications to Geographical Representations

Once you have your graphical representation in a CAD environment, you will want to look at how to order your information. It is be important to place like features on the same layer, using different layers for different types of topographical information or items. For example, place all the Parking Lots on a Layer called *parklots*, and all the buildings on a layer called *buildings*. If the number of buildings is large, then you may want to break the buildings up by type, I.E. Residential housing as *builders* layer, Administrative buildings as *buildadmin*, etc. Place the streets and avenues on the *streets* layer.

After you have your graphics display modified to deal with the different layers, you will want to "Turn Off" and "Freeze" all layers except those that contain items in your PAVER database, I.E. streets, parking lots, access ways, airfields, helipads, and pavements in general. Now create a new layer called *section* and make it the current layer. This is the layer on which you draw lines to enclose your sections as defined by your PAVER database. Use a combination of the existing lines on your streets, parking, and other pavement layers to define your polygon representation of sections. It is permissible to use lines from more than one layer to define a GIS polygon.

It is critical that each and every section be an enclosed polygon unto itself. You will want to systematically go through your PAVER database and graphically display each section on the computer, viewing the starting point, any features within the section, and where the section ends. This allows you to see where sections are and add section lines where needed. The following figures illustrate the addition of section lines:

In Figure 1., we consider the section of Boulder Ave. from the east side of the Boulder/ Ace intersection to the south side of the Boulder/Crandall intersection. To define this polygon correctly, we need to close it off from other streets. In Figure 2., we show with bold lines the appropriate places to augment the topographical lines with section lines to correctly define the polygon representing this section of Boulder.
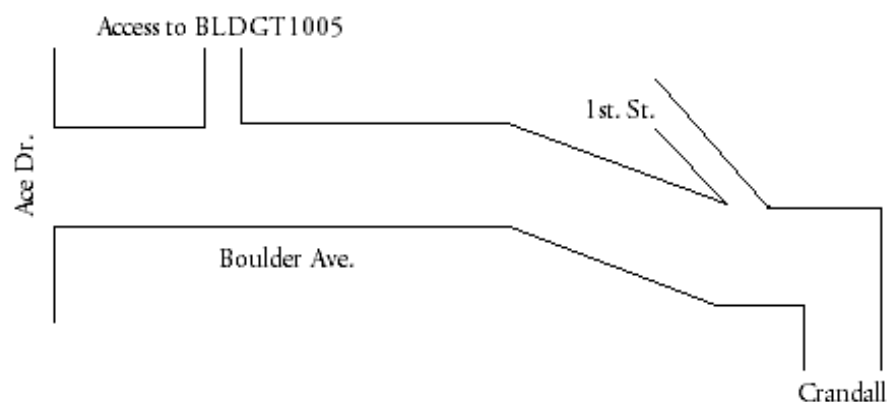

Figure 1.

You will not use bold lines in practice, but since we have chosen not to use different color lines, the bold lines represent lines on a different layer. This section of Boulder is now in correct GIS format (closed polygon). The regular lines represent topographical information, and the bold lines represent artificial information we added to aid in the definition of our PAVER generated Network/Branch/Sections.
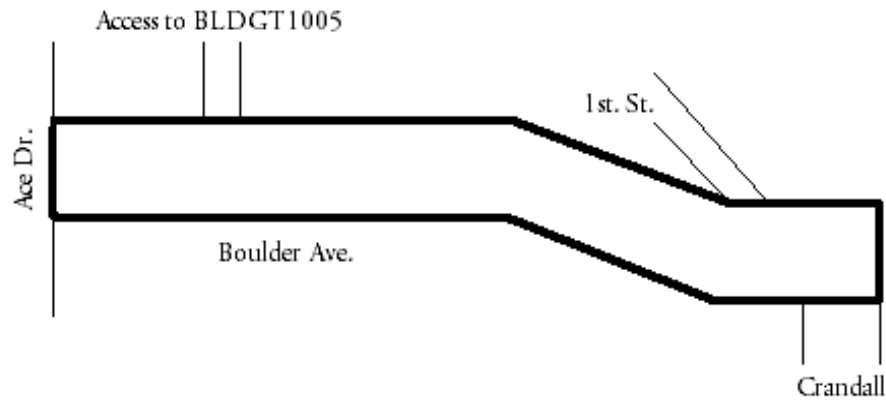

Figure 2.

We can take this a step further, as shown in Figure 3., and say that you desire to break this portion of Boulder into two sections. The first section starts at the East side of the intersection of Boulder/Ace, runs to the West side of the intersection of Boulder/1st, and runs to the south side of the intersection of Boulder/Crandall. We need to add one section line at the West side of the intersection at Boulder/1st:
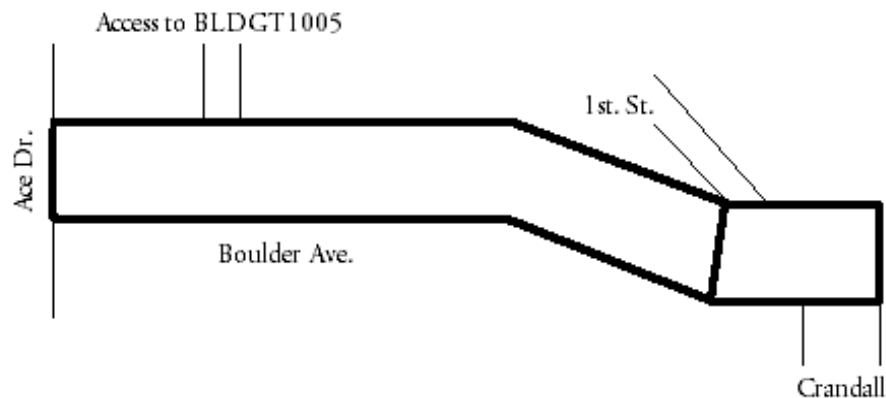

Figure 3.

The concept of subsections is important. For example, all driveways on Brown St. in a residential area may be treated as a single PAVER section even though they are noncontinuous. Subsections are parts of a section; the sum of all the subsections taken together comprise the whole section. They all have the same Network/Branch/Section ID number, and are represented by many polygons.

Build and Clean Operations for Digital Data

Once your polygons are closed you can create your coverage and assign label IDs for each polygon. AutoCAD users can discover polygon errors by using ArcCAD's Clean command. The Clean command creates the coverage and flag closure errors. Closure errors are locations in which a dangling line exists. Errors are indicated by small red boxes. Repair the closure errors in AutoCAD and create a new coverage. Ensure that you write down where you save the pavement coverage. The coverage file does not have an extension, and does not show up in the File Manager or Explorer. Intergraph users create a coverage using DGNARC2, manually review the coverage for errors, return to Intergraph to make repairs, and then create the coverage again. ArcInfo is a complete drawing editor with plotting tools, topology creation, and maintenance capabilities to create the coverage. If you do not have ArcInfo, a GIS viewer such as ArcView or MapInfo can be used. If you are using ArcView, open the new coverage and select Theme…Auto-label. This displays the polygon ID numbers for each polygon in the coverage. We recommend printing your coverage with the polygon label IDs. This map then helps you to perform the **Construct PAVERGIS link table** procedure described in the Setup operations section of the manual.

PAVERGIS Usage

PAVERGIS is the primary interface tool between PAVER and GIS. It converts a PAVER database to a dBase file and provides the means to link PAVER IDs (PID) with the coverage polygon numbers. To start the PAVERGIS Interface, click the **PAVERGIS** button on the PAVER button bar. This starts the PAVERGIS program and open the PAVERGIS desktop. The PAVERGIS Menu provides the following items/functions: **Update**, **Database**, **Prediction**, **Setup**, **Options**, and **Window**.

First-Time PAVERGIS Setup Summary

1. Select **Setup** from the main PAVERGIS menu.

2. Select the **Available Data Sources (PAVER & GIS)** option and specify the available PAVER and coverage files.

3. Select the **Prepare data** option. This feature now encompasses several operations that were separate in previous versions of Micro PAVER. The following operations are completed in a simplified format on one screen in the new PAVERGIS:

   • Exporting the PAVER data to dBase format.

   • Creating fields in your GIS coverage to match the fields from the PAVER database.

   • Export PAVER work plan or condition history reports to GIS.

- Match up the GIS map depicting pavement features with the PAVER defined pavement sections.

- Copy PAVER PIDs to the PAT/AAT file.

- Copy PAVER database information to PAT/AAT files.

- Enter ArcView and view data.

Steps for Initial Setup

Available Data Sources (PAVER & GIS)

Use this option to make PAVER database and GIS coverage information available for use with the PAVERGIS program. The PAVERGIS program can not operate until you specify the location for source files. This editor allows you to specify the location of your PAVER 4.x and 5.0 databases and GIS coverages.

To add a PAVER database to the list:

Click the **Add** button next to the PAVER Data table. Find your database. You may have to change the drive by using the **Drives** drop list. You may have to move to another directory. When your file name appears in the **File Name** box, highlight the file and click the **OK** button. Enter the **Description** for the database and click **OK**.

To place GIS coverage Data on-line:

1.   Click the **Add** button next to the coverage Data table.

2.   Locate the corresponding coverage database in the GIS directory and click **OK**. Be certain that you highlight the PAT.DBF file before clicking the **OK** button on the **File Dialog** form. Problems have been observed if the full path and file are not specified.

3.   Enter the **ID** for the coverage and press Enter.

4.   Enter a **Description** for the coverage and press Enter.

5.   Click the **Next** button to continue.

Available Data Sources screen

Click **Add** to add a PAVER database or GIS coverage to you list of available data

Click **Next** to move to the next screen and prepare the available data for GIS viewing

Preparation of Data

This screen is the condensed process by which the PAVER data and GIS coverage information is linked. The first step is to extract PAVER data from the PAVER data structures.

1. It is important to identify any Work Plan or Condition History reports from PAVER that you wish to view in the GIS. Check the box next to the report you wish to export. Click the **Select** button and browse for the report file.

2. The second step is to identify the appropriate GIS coverage by selecting it from the drop list.

3. The next stage is the construction of the link table between the Pavement ID's and the Polygon ID's. Click the **Load PID** button to place the Pavement ID's from the exported database into the link table.

4. The next step is to input the corresponding Polygon ID number for each Pavement Section. You can either open the coverage in a viewer or print out the coverage with the polygon ID numbers on it. In some cases, there may be several polygons contained within a single PAVER section. In that case, you can use the **Add** or **Delete** buttons to create duplicate sections and input all of the corresponding polygon numbers. NOTE: Only one polygon number should be inputted on a line.

Prepare Data screen

Select saved Work Plan or Condition History reports to be viewed in GIS

Input the polygon numbers from the coverage with the corresponding pavement ID numbers

Export the pavement data to the PAT/AAT table for GIS viewing

5. The final step is to Update the PAT/AAT from the exported database. This is the process of moving the pavement database information into the PAT/AAT tables using the previously created link. Just click **Update PAT/AAT from Export** to complete the operation. The **Initialize** box is selected by default. This means that all of the information in the PAT/AAT are overwritten. If you had previously created a work plan report for the coverage and viewed it, but returned and created a condition history report without changing the database, then you could uncheck the **Initialize** box.

Updating Data

This option is used to reflect PAVER data changes in GIS. If your PAVER databases have changed due to inspections, work planning, or construction activity, the PAVERGIS options let you quickly update your GIS databases.

Exporting PAVER Data (Access/Rbase to dBase)

This option invokes the program that extracts data from the PAVER data structures.

1. Select the radio button that corresponds to the PAVER data format for the database you wish to use. Select a database to export from the drop list. The default is the first database.

2. Click on the **Start** button. NOTE: If the **Start** Button is not available, the program cannot find a database to export.

3. Click on the **Quit** button when the process is complete.

Copying PAVER dBase Data to PAT/AAT

This option copies your PAVER database information to PAT/AAT files.

1. Select PAVER Data and coverage databases from the drop lists. Both default to the first databases in the list. If a change is required, click on the down arrow and select the desired database from the list.

2. Click the **Start** button.

3. Click the **Print** button to send the list to the default printer if required.

4. Click the **Quit** button.

Database Editors and Reporting Options

Tools to edit databases, maps, exported PAVER databases, and link tables.

Edit PAVER dBase format table: This editor enables the editing or printing of information extracted from PAVER.

1. Use the drop list to select a database.

2. Click the **Open** button.

3. Click on a box in the table to edit or right click and select from the **Fields Shown/ Hidden** on the table.

4. Click the **Print** button to send the list to the default printer.

5. Select the **Quit** button when editing is complete.

Edit PAT/AAT file: This editor enables the editing or printing of information contained in the GIS database following the update from PAVER Exported data. You can use this editor to alter information stored for a segment. This information is directly accessed by the GIS map programs. The changes made in pavement data is over written when you "Copy PAVER dBase data to PAT/AAT."

1. Use the drop list to select a coverage.

2. Click the **Open** button.

3. Click on any of the boxes to edit and correct the data.

4. Click the **Print** button to send the list to the default printer.

5. Click the **Quit** button to exit.

Note: All PAVERGIS tables may be customized by clicking the right mouse button while the table is highlighted, for more information, see the "Right Button Click on Tables" section. In addition to changes available through Browse Properties, columns may be re-sized or dragged to change their order, directly on the table.

Rebuild PAVERGIS link table: This option is used to rebuild the GIS link table when the Attribute PAT/AAT table (selected from the Options menu) has been previously populated. This typically occurs when you add a new section or break an existing section into multiple sections.

1. Select a Map ID using the drop list box.

2. Click on the **Go** button to rebuild the link table.

3. Click on the **Quit** button to exit.

Edit PAVER dBase File screen

Edit PAT/AAT File screen
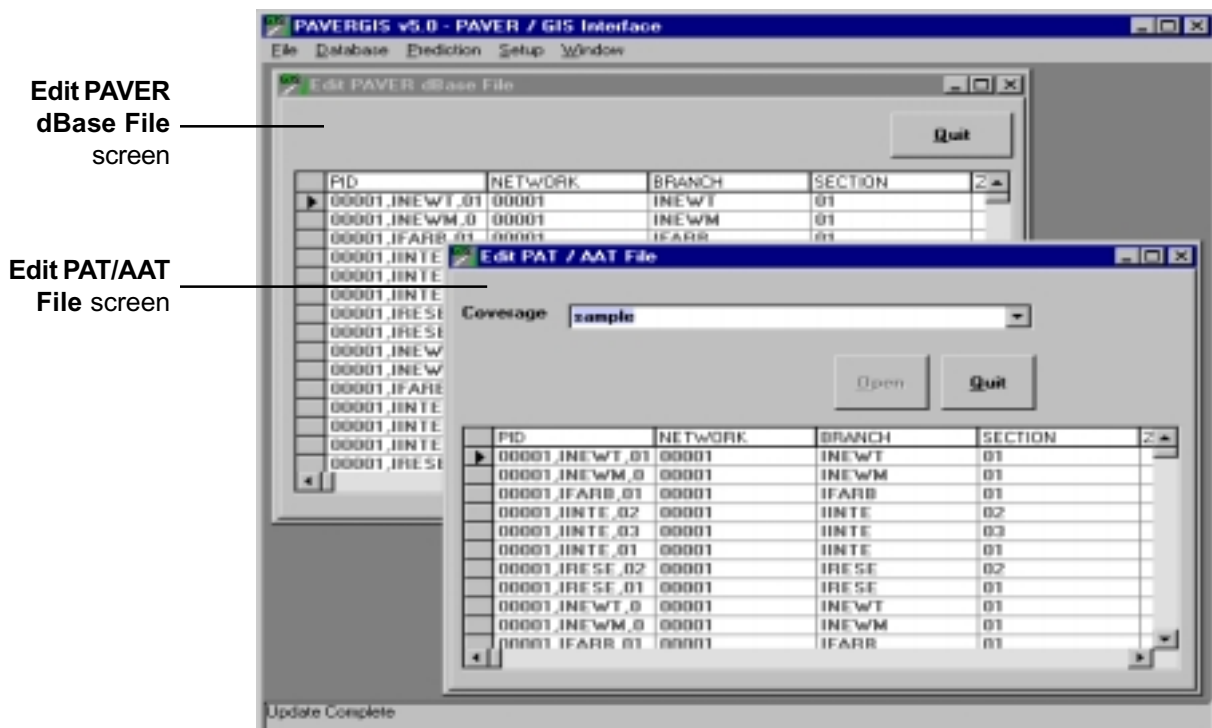
Options for Viewing Windows

Cascade: This option arranges any open windows in the application so that they overlap each other with only the title bar of each window visible.

Tile Horizontal: This option arranges any open windows in the application so that no window overlaps another. All windows are visible and stacked from the top to the bottom on the screen.

Tile Vertical: This option arranges any open windows in the application so that no window overlaps another. All windows are visible and stacked from left to right on the screen.

Arrange Icons: This option automatically arranges the icons.

Exiting PAVERGIS

Exit PAVERGIS: This option takes the PAVERGIS user out of the application and closes the Interface window.

About PAVERGIS: This option provides the PAVERGIS user with information on the application.
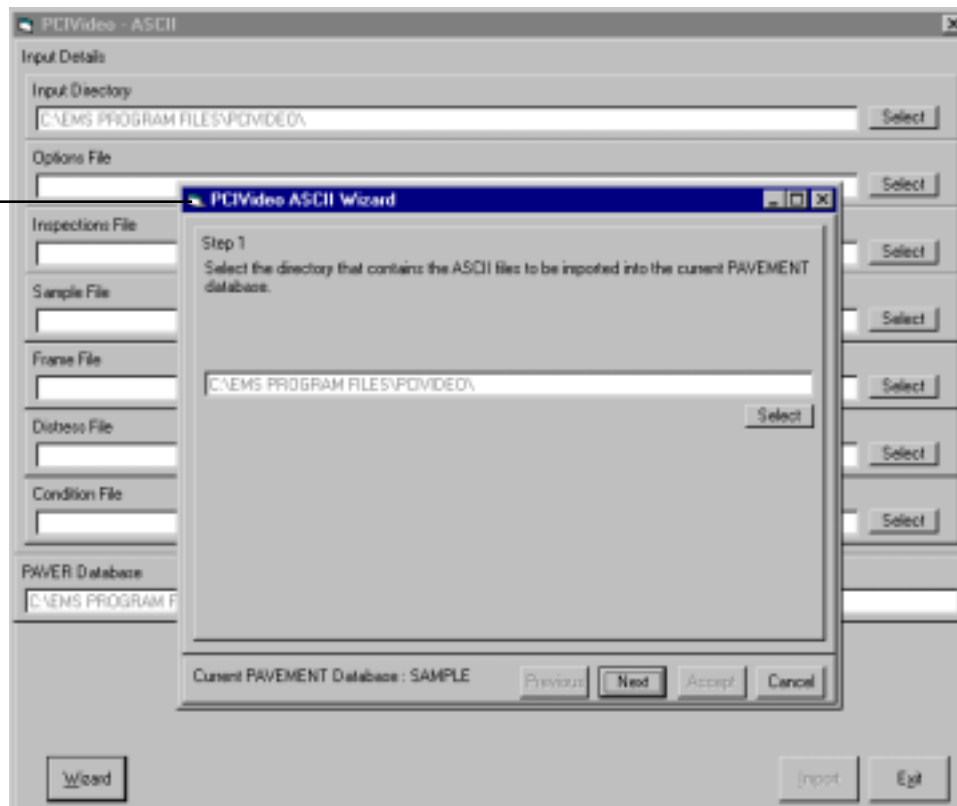
Condition Data Import (ASCII)

The **Condition Data Import (ASCII)** feature allows you to import data into PAVER using ASCII file format. Upon launching the feature, a file wizard is opened to help guide PAVER towards the appropriate data files. For examples of how to format files for ASCII Video Inspection Import see **Appendix C-1.**

The ASCII Condition Data Import wizard helps guide PAVER to the correct files

Note

You can either use the wizard to locate the files, or locate the files one by one without the wizard.

Condition Data Import (Database)

The **Condition Data Import (Database)** feature allows you to import data into PAVER using .mdb file format. Locate the database file that you wish to import by first selecting the **Inuput Directory** and then selecting the **Database Name**. For more information on video inspection import data format for Access Databases see **Appendix C-2.**

Select the
**Inuput Direc-
tory**

Select the
**Database
Name**
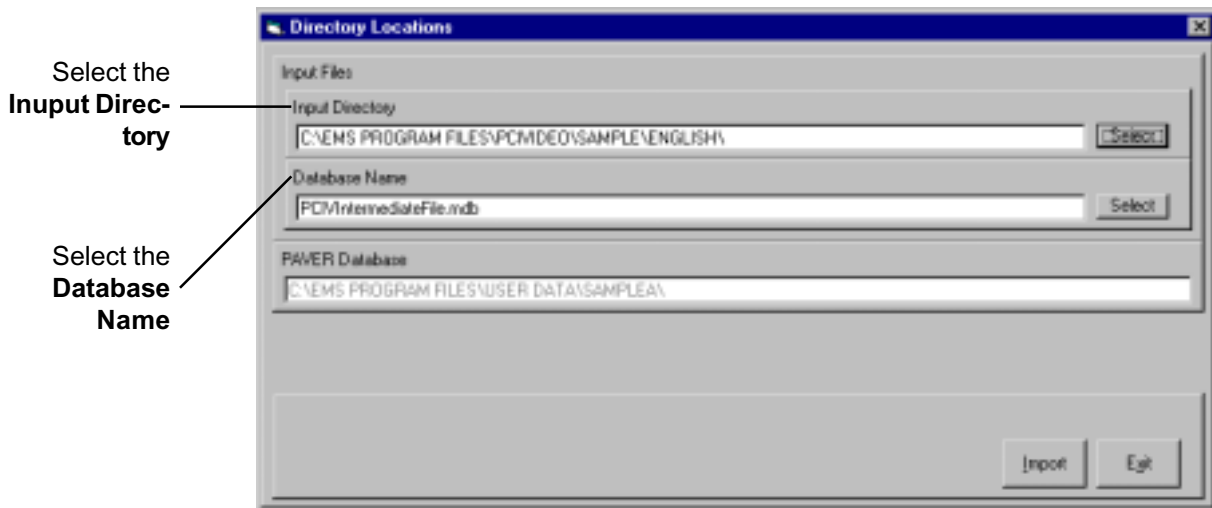
Handheld Data Import

Micro PAVER Inspection Data Entry Using a Windows CE Handheld Device

Hardware/Software Requirements

For the installation of the **Handheld PCI Inspector** program, a handheld device with the Windows CE operating system and Microsoft Pocket Access is required. In addition, Microsoft Active Sync must be installed on the computer (herein referred to as "main computer") that inspection information will be downloaded from and uploaded to. Additionally, PAVER must be installed on the main computer.

Software Installation

First, install Microsoft Active Sync on the main computer. Microsoft Active Sync is a free program that can be downloaded from www.microsoft.com. Second, link the handheld device to the main computer by connecting the two via serial port or USB port and launch Microsoft Active Sync. When prompted by Microsoft Active Sync to setup a partnership with this computer select "No".

Note: A partnership is used when the synchronizing of files on the handheld and PC are desired—this is not necessary for this Micro PAVER application.

To install the necessary software to the handheld device, select the install file from the handheld installation CD.

Basic Software Operation

Process Overview

In an effort to expedite the Pavement Condition Index (PCI) field inspection process, PAVER has the added capability of interacting with Windows CE, handheld devices. This capability was developed as an "add-in" to PAVER and currently ships with Micro PAVER 5.0.

Handheld Data Import is accessed in PAVER through the **Add-Ins** menu. Data for field inspections can be downloaded from Micro PAVER to a Windows CE, handheld device that has the **Handheld PCI Inspector** program installed.

Typically when preparing for a field inspection, the first step is to download the sections to be inspected to the Windows CE, handheld device. Data transfer between the main computer and the Windows CE device is facilitated with Microsoft Active Sync. With Microsoft Active Sync, sections to be inspected may be transferred from the main computer to the Windows CE, handheld device using the **Download Sections to Inspect** tab available through the Micro PAVER **Add-Ins** menu. Once the appropriate sections are transferred to the handheld device, the handheld device is ready for use in the field.

After the inspection has been completed, the data on the Windows CE, handheld device must be backed-up using the **Backup Inspection Data** tab that is accessed through the PAVER **Add-Ins** menu. The backed-up data may then immediately be imported into PAVER or imported at a later date. In order to import the data the third tab labeled **Import Backup Data into PAVER** is used. During the data import, all distress information is transferred to the appropriate Micro PAVER database on the main computer.

The **Handheld Data Import** option in the PAVER **Add-Ins** menu launches a window with three tabs that perform three different tasks. The first tab is used to **Download Sections to Inspect**. The second tab is used to **Backup Inspection Data** after an inspection has been performed. The third tab is **Import the Backup Data into PAVER**. If no device is detected by PAVER, you are only allowed to use the third tab to import previously backed data into PAVER.

Detailed Process

Download Sections to Inspect

When downloading sections to inspect, the user has available three methods to select the sections to download to the handheld device.

1.   The first method is to **Use PAVER Selections**. This method allows the user to select the desired sections using any of the PAVER **Selectors** such as the **Tree Selector**. Sections selected using the **Tree Selector** are automatically placed in the download queue.

2.   The second way to choose the sections to download is to **Use the Inspection Schedule**. This method allows the user to choose sections based upon their inspection schedule. Based on the Inspection Schedule selected, PAVER automatically selects the appropriate sections to inspect.

3.   The final method to choose the sections to download is to **Use the Query Tool**. This method uses the PAVER **Query Tool** to search for all desired sections.

Current online database

Three methods for locating sections to be downloaded

List of sections selected for download

Note

When sections are downloaded to the handheld device, the data on the handheld device is overwritten. Make sure that all data is backed-up prior to downloading sections.

Once the desired sections are found using the second two methods, click the **Add Items** button to move the sections into the download queue. To remove a section from the queue, just highlight the row or rows to be removed and click the **Remove** button. As soon as all the desired sections are queued, click the **Transfer** button and the sections are downloaded into the handheld program. Note: This overwrites any inspection data that is on the handheld. ***Be sure that all data from the handheld has been backed up into Micro PAVER before transferring new data to the handheld.*** Fortunately, PAVER alerts the user if data that has not been backed up is about to be overwritten.

Inspections Using the Handheld PCI Inspector

After data has been transferred to the handheld device, field inspections may be carried out using the **Handheld PCI Inspector** program. The **Handheld PCI Inspector** program is separated into three tabs: **1. Sections**, **2. Samples/Frames**, and **3. Distresses**.

The **Sections** tab enables the user to view downloaded sections, add new sections to inspect or add comments. Downloaded and added sections appear in the large text box listed by network, branch, and section names. When adding a new section the user can edit network, branch and section names along with the use, surface, area, number of samples or frames, and age.

The **Samples/Frames** tab allows the user to edit or add specific samples/frames. Downloaded samples/frames appear in the large text box. Unlike the **Sections Tab**, you may delete or edit any downloaded samples/frames. In addition, a sample may be declared to have no distresses by clicking the **No Distress** checkbox.

The **Distresses** tab allows the user to enter the distresses for each inspected sample/frame. The current sections and samples/frames are indicated at the top of the screen, and may be switched by clicking the left or right arrows on either side of the section or sample/frame ID. In order to add a new distress, click **New**. The distress type then can be either picked from the list of distress types or entered into the text box. Distress severities are selected from the pull down menu (if applicable) and distress quantities may be entered directly. In order to save the entered distress data, use **Save**. If a sample has no distresses, click the **No Distresses** checkbox. When working with frames, if a new frame is desired click the **New Frame** button, and a new frame is added with the same attributes as the previous frame.

The following information pertains to all three tabs. When adding a new section, sample, or distress, the user must first click **New** and then click **Save** after editing the appropriate fields. The user must also remember to select **Save** after **Editing** existing sections, samples, or distresses. Data may be entered by using the keyboard, the number keypad, or handwriting recognition for all data entry text boxes. ***Make sure that the cursor is located in the box that you wish to enter data.*** When using the number keypad, highlighted text cannot be overwritten – the user must click the **C** button to clear the text prior to entering the data. Comments may be added to any distress, sample, section, or inspection by clicking on the **Comments** button and either writing or typing the comment in the box.

Note: When writing a comment, the user must first make sure that the cursor is located in the comment box by first tapping the comment box to make the cursor appear. Any added section, sample or distress may be deleted by clicking the **Del** button. Sections downloaded from Micro PAVER cannot be deleted. Finally, the user may calculate the PCI for a section by clicking the **Calc** button on any of the three tabs. In order to see a detailed calculation of the PCI and Structural PCI, the user may elect to see the details by clicking the **Details** checkbox before performing the calculation. The calculated PCI and Structural PCI can also be seen on the **Sections** tab after calculations have been done.

Backup Inspection Data

Once the inspection data has been collected using the handheld device, the user must **Backup the Inspection Data** using the second tab from the **Add-Ins** menu. After connecting the handheld device to the main computer using **Microsoft Active Sync** as before, go to the **Add-Ins** menu and select **Handheld Inspector**. Using the second tab, **Backup Inspection Data**, select the appropriate file to be backed-up. Once a name is selected, click **Backup** to create the backup file. The backed-up files are automatically placed in the following directory: EMS Program Files\User Data*Name of Current Open Database*\ PI-Backup Data\. Since the backup files are put in these locations it is important to be in the correct database when backing-up files and importing files from the handheld device.

List of previously backed up databases

Enter desired name for the backup file
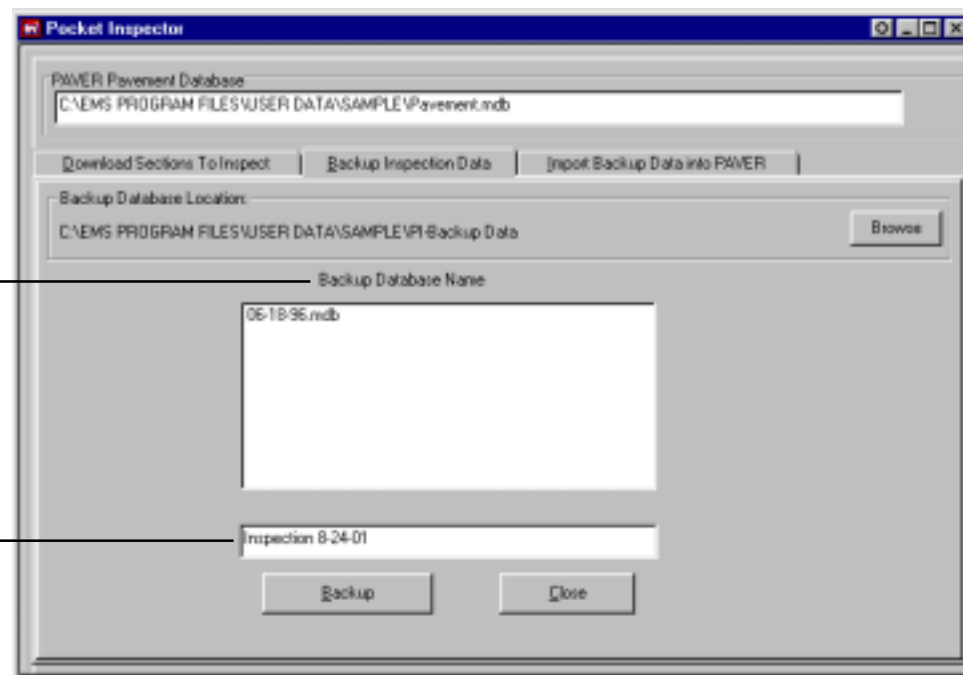
Import Backup Data into PAVER

After backup files have been created, the user may then **Import Backup Data into PAVER** by using the third tab on the Handheld Inspector menu. First select the backup file to import by hitting the **Select** button and choosing from the list.

Note: PAVER automatically places and selects files from a default location: EMS Program Files\User Data*Name of Database*\PI-Backup Data\.
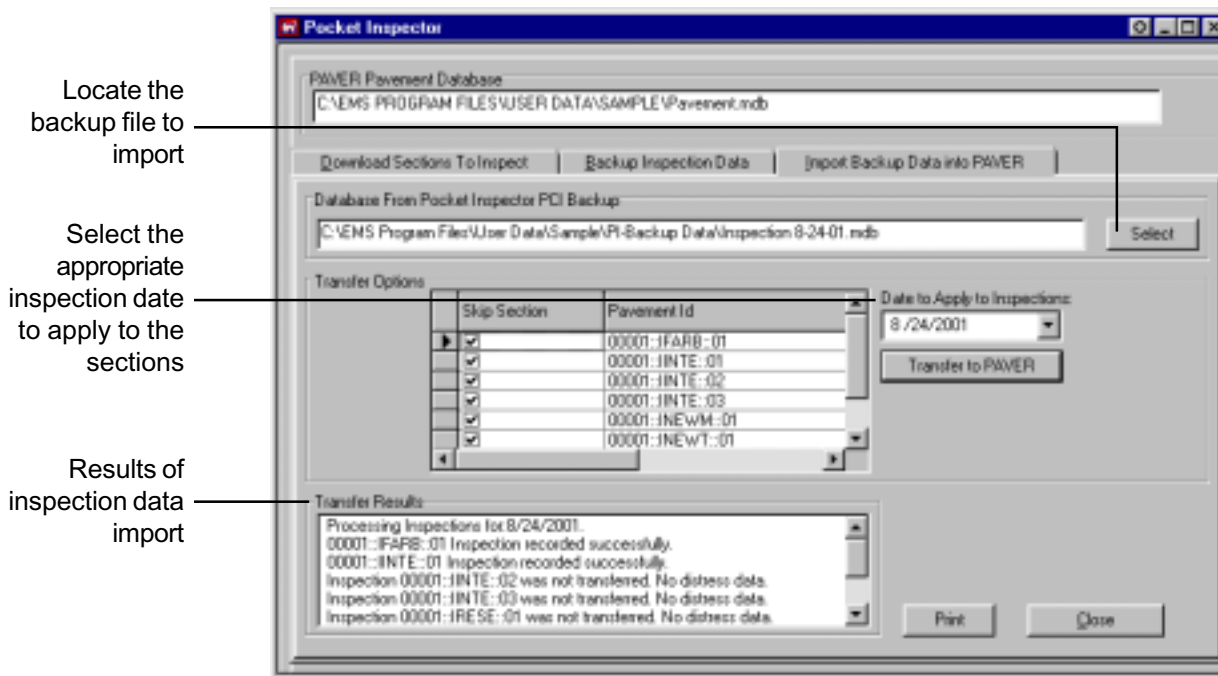
After selecting the backup file, select the inspection date to apply to the data.

Note: If some sections were not inspected or a different inspection date is required for some sections, check the box next to the sections that should be skipped.

Finally, click **Transfer to PAVER** to transfer the files into PAVER. The transfer results indicate what sections where successfully imported and which ones were not.

Note: if a section has no inspection information, the information is not imported into PAVER for that inspection date.

If desired, the transfer results may be printed by clicking the **Print** button at the bottom of the tab.

<table>
<tr><td>**Hint**

When downloading and importing data, make sure the correct PAVER database is online.</td></tr>
</table>

Locate the backup file to import

Select the appropriate inspection date to apply to the sections

Results of inspection data import

PAVER Shape File Converter

Converting from PAVER 4.x to 5.0

The **PAVER Shape File Converter** is used to convert shape files that were used in version 4.x of PAVER to be used in version 5.0 of PAVER. The difference between shape files in version 4.x and version 5.0 is that in 5.0 shape files now contain a Unique ID. The conversion of the shape file will check to see if the file contains a Unique ID and add the field, if necessary. Converting coverages from PAVER 4.x to 5.0 is a two step process. You must first take the PAVER 4.x coverage file into ArcView and convert the *.cov file to a shape file (*.shp). To complete the process, the shape file must be converted using the **PAVER Shape File Converter**. Once the shape file is converted, the process is completed.

Shape File Conversion Procedure

Note

When converting shape files, the database that is to be associated with the shape file must be online for the procedure to work correctly.

The **PAVER Shape File Converter** module contains three sections. The first section displays the **Source Shape File**, the second section displays the **Destination Shape File**, and the third section displays the results of the conversion process. You must first locate the shape file you wish to convert. This is done by clicking the **Select** button to browse your computer for appropriate files. Once the file is selected, PAVER then checks that the file contains a UNIQUEID and PID. PAVER also automatically sets the destination of the converted file in the folder for the online database. To complete the conversion process click the **Convert** button. As the conversion takes place, the results will be shown in the lower window.

Select the source shape file

Destination of the converted shape file

Results of the shape file conversion
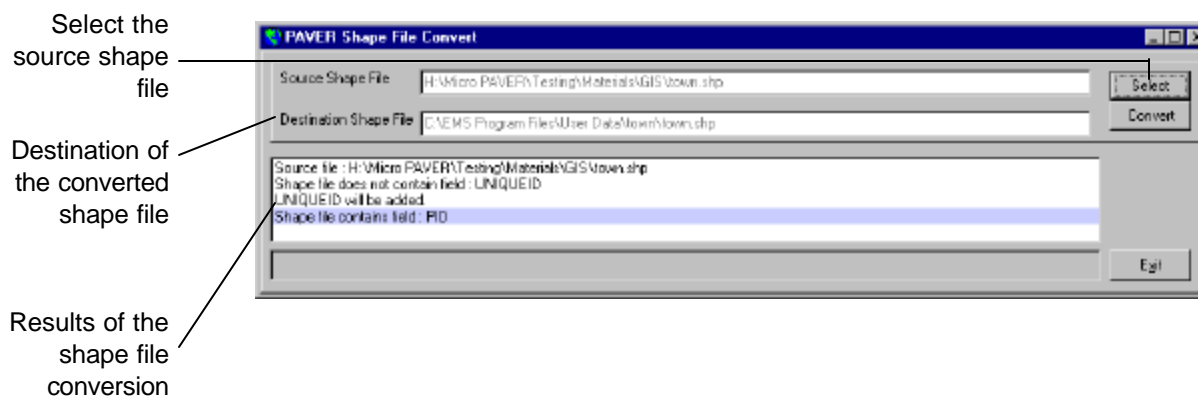
Shape File Coordinate Shift

The **Shape File Coordinate Shift** module functions like the PAVER Shape File Converter discussed above. However, this module also allows you to shift the coordinates of the shape file during conversion. Similarly, the **Shape File Coordinate Shift** is also divided into three sections. The first section displays the **Source Shape File**, the second section displays the **Destination Shape File**, and the third section displays the results of the conversion process. You must first locate the shape file you wish to convert. This is done by clicking the **Select** button to browse your computer for appropriate files.

Once the file is selected, PAVER then checks that the file contains a UNIQUEID and PID. The coordinates of the selected shape file are displayed. Once the file is loaded, you may then click the **Select** button in the **Destination Shape File** area of the box. After selecting the destination file you are then able to select the appropriate **Shift Mode** for the converted shape file. You may select a premade shift mode or a **User Specified** shift mode from the drop down box. To complete the conversion process click the **Convert** button. As the conversion takes place, the results will be shown in the lower window.

Select the source shape file —

Destination of the converted shape file —

Choose the desired Shift Mode —

Results of the shape file conversion —